

# SH7216 Group PLBG0176GA-A User System Interface Converter Board

R0E572167CBG10 User's Manual

Renesas Microcomputer Development Environment System  
SuperH™ Family / SH7216 Series

R0E572167CBG10E



## Notice

1. All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas Electronics products listed herein, please confirm the latest product information with a Renesas Electronics sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas Electronics such as that disclosed through our website.
2. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
3. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part.
4. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
5. When exporting the products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You should not use Renesas Electronics products or the technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations.
6. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
7. Renesas Electronics products are classified according to the following three quality grades: "Standard", "High Quality", and "Specific". The recommended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below. You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application categorized as "Specific" without the prior written consent of Renesas Electronics. Further, you may not use any Renesas Electronics product for any application for which it is not intended without the prior written consent of Renesas Electronics. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for an application categorized as "Specific" or for which the product is not intended where you have failed to obtain the prior written consent of Renesas Electronics. The quality grade of each Renesas Electronics product is "Standard" unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.
  - "Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots.
  - "High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; safety equipment; and medical equipment not specifically designed for life support.
  - "Specific": Aircraft; aerospace equipment; submersible repeaters; nuclear reactor control systems; medical equipment or systems for life support (e.g. artificial life support devices or systems), surgical implantations, or healthcare intervention (e.g. excision, etc.), and any other applications or purposes that pose a direct threat to human life.
8. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
9. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
10. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
11. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

(Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

(Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.



# IMPORTANT INFORMATION

## READ FIRST

- **READ this user's manual before using this emulator product.**
- **KEEP the user's manual handy for future reference.**

**Do not attempt to use the emulator product until you fully understand its mechanism.**

### **Emulator Product:**

Throughout this document, the term "emulator product" shall be defined as the following products produced only by Renesas Electronics Corp. and Renesas Solutions Corp. excluding all subsidiary products.

- E200F main unit
- External bus trace unit
- Evaluation-chip unit
- Profiling expansion unit
- Emulation memory unit
- Common user-system interface adaptor cable
- User-system interface converter board
- Trace cable

The user system or a host computer is not included in this definition.

### **Purpose of the User System Interface Converter Board:**

The user system interface converter board is used to connect the evaluation chip unit to the user system. This user system interface converter board must only be used for the above purpose.

### **Limited Applications:**

This emulator product is not authorized for use in transportation, vehicular, medical (where human life is potentially at stake), aerospace, nuclear, or undersea repeater applications. Buyers of this emulator product must notify Renesas Electronics Corporation, Renesas Solutions Corporation or an authorized Renesas Electronics product distributor before planning to use the product in such applications.

### **Improvement Policy:**

Renesas Electronics Corp. (including its subsidiaries, hereafter collectively referred to as Renesas) pursues a policy of continuing improvement in design, performance, and safety of the emulator product. Renesas reserves the right to change, wholly or partially, the specifications, design, user's manual, and other documentation at any time without notice.

## **Target User of the Emulator Product:**

This emulator product should only be used by those who have carefully read and thoroughly understood the information and restrictions contained in the user's manual. Do not attempt to use the emulator product until you fully understand its mechanism.

It is highly recommended that first-time users be instructed by users that are well versed in the operation of the emulator product.

Users are required to be familiar with the basic knowledge for the electric circuits, logic circuits, and microcomputers.

## **Precautions to be Taken when Using This Product:**

1. This emulator is a development supporting unit for use in your program development and evaluation stages. In mass-producing your program you have finished developing, be sure to make a judgment on your own risk that it can be put to practical use by performing integration test, evaluation, or some experiment else.
2. In no event shall Renesas Solutions Corporation be liable for any consequence arising from the use of this emulator.
3. Renesas Solutions Corporation strives to renovate or provide a workaround for product malfunction at some charge or without charge. However, this does not necessarily mean that Renesas Solutions Corporation guarantees the renovation or the provision under any circumstances.
4. This emulator has been developed by assuming its use for program development and evaluation in laboratories. Therefore, it does not fall under the application of Electrical Appliance and Material Safety Law and protection against electromagnetic interference when used in Japan.
5. This emulator does not conform to safety standards such as UL or IEC. Be careful when you take this emulator overseas.
6. Renesas cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this user's manual and on the emulator product are therefore not all inclusive. Therefore, you must use the emulator product safely at your own risk.

## **LIMITED WARRANTY**

Renesas warrants its emulator products to be manufactured in accordance with published specifications and free from defects in material and/or workmanship. Renesas, at its option, will replace any emulator products returned intact to the factory, transportation charges prepaid, which Renesas, upon inspection, shall determine to be defective in material and/or workmanship. The foregoing shall constitute the sole remedy for any breach of Renesas' warranty. See the Renesas warranty booklet for details on the warranty period. This warranty extends only to you, the original Purchaser. It is not transferable to anyone who subsequently purchases the emulator product from you. Renesas is not liable for any claim made by a third party or made by you for a third party.

## **DISCLAIMER**

RENESAS MAKES NO WARRANTIES, EITHER EXPRESS OR IMPLIED, ORAL OR WRITTEN, EXCEPT AS PROVIDED HEREIN, INCLUDING WITHOUT LIMITATION THEREOF, WARRANTIES AS TO MARKETABILITY, MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE OR USE, OR AGAINST INFRINGEMENT OF ANY PATENT. IN NO EVENT SHALL RENESAS BE LIABLE FOR ANY DIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE, OR LOSSES OR EXPENSES RESULTING FROM ANY DEFECTIVE EMULATOR PRODUCT, THE USE OF ANY EMULATOR PRODUCT, OR ITS DOCUMENTATION, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. EXCEPT AS EXPRESSLY STATED OTHERWISE IN THIS WARRANTY, THIS EMULATOR PRODUCT IS SOLD "AS IS", AND YOU MUST ASSUME ALL RISK FOR THE USE AND RESULTS OBTAINED FROM THE EMULATOR PRODUCT.

## **State Law:**

Some states do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may have other rights which may vary from state to state.

## **The Warranty is Void in the Following Cases:**

Renesas shall have no liability or legal responsibility for any problems caused by misuse, abuse, misapplication, neglect, improper handling, installation, repair or modifications of the emulator product without Renesas' prior written consent or any problems caused by the user system.

## **All Rights Reserved:**

1. Circuitry and other examples described herein are meant merely to indicate the characteristics and performance of Renesas' semiconductor products. Renesas assumes no responsibility for any intellectual property claims or other problems that may result from applications based on the examples described herein.
2. No license is granted by implication or otherwise under any patents or other rights of any third party or Renesas.
3. This user's manual and emulator product are copyrighted and all rights are reserved by Renesas. No part of this user's manual, all or part, may be reproduced or duplicated in any form, in hard-copy or machine-readable form, by any means available without Renesas' prior written consent.

## **Figures:**

Some figures in this user's manual may show items different from your actual system.

# SAFETY PAGE

## READ FIRST

- **READ this user's manual before using this emulator product.**
- **KEEP the user's manual handy for future reference.**

**Do not attempt to use the emulator product until you fully understand its mechanism.**

## DEFINITION OF SIGNAL WORDS

Either in the user's manual or on the product, several icons are used to insure proper handling of this product and also to prevent injuries to you or other persons, or damage to your properties. Their graphic images and meanings are given in this safety page. Be sure to read this chapter before using the product.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



### **DANGER**

**DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



### **WARNING**

**WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



### **CAUTION**

**CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

### **CAUTION**

**CAUTION** used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

**NOTE** emphasizes essential information.

In addition to the four above, the following are also used as appropriate.

 means WARNING or CAUTION.

Example:  CAUTION AGAINST AN ELECTRIC SHOCK

 means PROHIBITION.

Example:  DISASSEMBLY PROHIBITED

 means A FORCIBLE ACTION.

Example:  UNPLUG THE POWER CABLE FROM THE RECEPTACLE.



# WARNING

## Warnings for AC Power Supply:



- If the attached AC power cable does not fit the receptacle, do not alter the AC power cable and do not plug it forcibly. Failure to comply may cause electric shock and/or fire.
- Use an AC power cable which complies with the safety standard of the country.
- Do not touch the plug of the AC power cable when your hands are wet. This may cause electric shock.
- This product is connected signal ground with frame ground. If your developing product is transformless (not having isolation transformer of AC power), this may cause electric shock. Also, this may give an unrepairable damage to this product and your developing one.

While developing, connect AC power of the product to commercial power through isolation transformer in order to avoid these dangers.



- If other equipment is connected to the same branch circuit care should be taken not to overload the circuit. Refer to nameplate for electrical ratings.
- When installing this equipment, insure that a reliable ground connection is maintained.



# WARNING



- If you smell a strange odor, hear an unusual sound, or see smoke coming from this product, then disconnect power immediately by unplugging the AC power cable from the outlet.

**Do not use this as it is because of the danger of electric shock and/or fire. In this case, contact your local distributor.**

- When installing or connecting this product with other equipment, shut down AC power or disconnect the AC power cord from the equipment to prevent personal injury or damage to the equipment.

## Warnings to Be Taken for This Product:



- Do not disassemble or modify this product. Personal injury due to electric shock may occur if this product is disassembled and modified.
- Make sure nothing falls into the cooling fan on the top panel, especially liquids, metal objects, or anything combustible.

## Warning for Installation:



- Do not set this product in water or areas of high humidity. Make sure that the product does not get wet. Spilling water or some other liquid into the product may cause unrepairable damage.

## Warning for Use Environment:

- This equipment is to be used in an environment with a maximum ambient temperature of 35°C. Care should be taken that this temperature is not exceeded.

## ⚠ CAUTION

### Cautions for AC Adapter:

#### ! • Use only the AC adapter included in this product package.

- The included AC adapter is for this emulator. Do not use it for other product.
- The DC plug on the included AC adapter has the below polarity.



- The included AC adapter has no power supply switch. The AC adapter is always active while connecting the AC power cable. Check if the power is supplied by the LED of AC adapter.

### Cautions to Be Taken for This Product:

#### ! • Use caution when handling this product. Be careful not to apply a mechanical shock.

- Do not pull the main unit by the probe of the emulation probe or the flexible cable which are connected to this product. Excessive flexing or force of the flexible cable for connecting this product to the emulation probe may break connector.

### Caution for Installation:

#### ! • When in use do not place the emulator on its side.



# WARNING

**Observe the precautions listed below. Failure to do so will result in a FIRE HAZARD and will damage the user system and the emulator product or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.**

- 1. Do not repair or remodel the emulator product by yourself for electric shock prevention and quality assurance.**
- 2. Always switch the E200F emulator and user system OFF before connecting or disconnecting any CABLES or PARTS.**
- 3. Always before connecting any CABLES, make sure that the pin 1 positions on both sides are correctly aligned.**

# Regulatory Compliance Notices

## European Union Regulatory Notices on Electromagnetic Compatibility

### CE Certifications:

This product complies with the following European EMC standards.

- EMC Directive 2004/108/EC

### EN 55022 Class A

**WARNING:** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

### EN 55024

Environmental Compliance and Certifications:

- WEEE Directive (2002/96/EC)



Renesas development tools and products are directly covered by the European Union's Waste Electrical and Electronic Equipment, (WEEE), Directive 2002/96/EC. As a result, this equipment, including all accessories, must not be disposed of as household waste but through your locally recognized recycling or disposal schemes. As part of our commitment to environmental responsibility Renesas also offers to take back the equipment and has implemented a Tools Product Recycling Program for customers in Europe. This allows you to return equipment to Renesas for disposal through our approved Producer Compliance Scheme. To register for the program, click here "<http://www.renesas.com/weee>".

### Information for traceability:

- Authorised representative

Name: Renesas Electronics Corp.  
Address: 1753, Shimonumabe, Nakahara-ku, Kawasaki-shi, Kanagawa, 211-8668, Japan

- Manufacturer

Name: Renesas Solutions Corp.  
Address: Nippon Bldg., 2-6-2, Ote-machi, Chiyoda-ku, Tokyo 100-0004, Japan

- Person responsible for placing on the market

Name: Renesas Electronics Europe Ltd.  
Address: Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.

- Trademark and Type name

Trademark: Renesas  
Product name: E200F Emulator  
Type name: R0E572167CBG10

## **United States Regulatory Notices on Electromagnetic Compatibility**

### **FCC Certifications:**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

---

**CAUTION:** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

---

## Preface

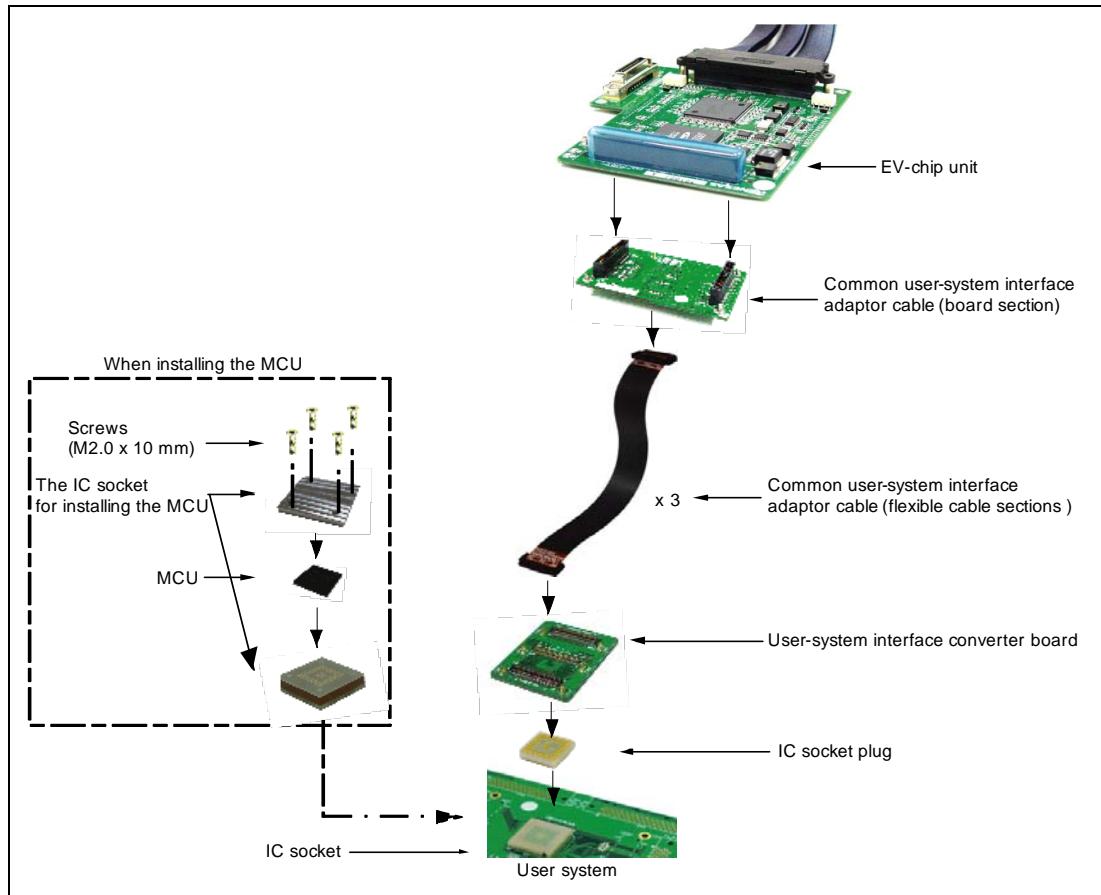
The R0E572167CBG10 is a user system interface converter board that connects a user system for the SH7216 in the PLBG0176GA-A package (Former package code: BP-176V) to the SH7216 E200F emulator (R0E0200F1EMU00 or R0E572160VKK00).

# Contents

Section 1 Configuration.....	1
Section 2 Environmental Conditions.....	5
Section 3 Connection Procedures .....	7
3.1    Connecting User System Interface Board to User System.....	7
3.1.1    Installing the IC Socket.....	7
3.2    Connection to the User System When the Flexible Cable is in Use .....	9
3.2.1    Assembling the User System Interface Cable.....	9
3.2.2    Connecting User System Interface Board to EV-Chip Unit .....	12
3.2.3    Installing to the IC Socket .....	14
3.3    Connection to the User System When the Flexible Cable is Not in Use .....	15
3.3.1    Mounting on the IC Socket.....	15
3.3.2    Connecting the Common User-System Interface Adaptor Cable (Board Section).....	16
3.3.3    Adjusting the Spacer Position .....	18
3.3.4    Connecting the User System Interface Board to EV-Chip Unit.....	19
3.4    Dimensions .....	21
3.4.1    Recommended Dimensions for User System Mount Pad (Footprint).....	21
3.4.2    External Dimensions.....	22
3.4.3    Dimensions of User System Interface Converter Board when Connected .....	23
Section 4 Installing the MCU to the User System.....	27
Section 5 Verifying Operation.....	29
Section 6 Notice .....	31

# Section 1 Configuration

Figure 1 and table 1 show the external appearance and components, respectively, of the user system interface converter board for the PLBG0176GA-A. Please make sure you have all of these components when you unpack the product.



**Figure 1 Appearance of the User-System Interface Converter Board for SH7216 Group Products in the PLBG0176GA-A Package**

## CAUTION

**Use the following item with the IC socket for PLBG0176GA-A package on the user system:**

**CSPLUG/W176A1513RE01 IC-socket plug (manufactured by Tokyo Eletech Corporation).**

**To connect the emulator with the user-system interface converter board for the PLBG0176GA-A, the common adaptor cable (R0E200F1CKL11) for the interface board must be obtained separately.**

**The BSSOCKET176A1513RE21N IC socket and LSPACK176A1513RE01 IC socket for mounting the MCU (both are manufactured by Tokyo Eletech Corporation) are also to be purchased separately. Please contact Tokyo Eletech Corporation for details.**

**Table 1 R0E572167CBG10 Components**

No.	Component	Quantity	Remarks
1	User-system interface PLBG0176GA-A converter board	1	R0E572167CBG10
2	IC socket plug	1	CSPLUG/W176A1513RE01 for use to connect the socket for PLBG0176GA-A package
3	User's manual	1	User's manual for R0E572167CBG10 (this manual)



## Section 2 Environmental Conditions

Maintain the conditions in table 2 when using the emulator.

**Table 2 Environmental Conditions**

Item	Specifications
Temperature	Operating: +10 to +35°C Storage: -10 to +35°C
Humidity	Operating: 35 to 80% RH, no condensation Storage: 35 to 80% RH, no condensation
Vibration	Operating: 2.45 m/s <sup>2</sup> max. Storage: 4.9 m/s <sup>2</sup> max. Transportation: 14.7 m/s <sup>2</sup> max.
Ambient gases	There must be no corrosive gases present.



## Section 3 Connection Procedures

### 3.1 Connecting User System Interface Board to User System



## WARNING

**Always switch OFF the user system and the emulator product before the USER-SYSTEM INTERFACE CONVERTER BOARD is connected to or removed from any part. Before connecting, make sure that pin 1 on both sides are correctly aligned. Failure to do so will result in a FIRE HAZARD and will damage the user system and the emulator product or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.**

#### 3.1.1 Installing the IC Socket

Solder the IC socket (BSSOCKET176A1513RE21N manufactured by Tokyo Eletech Corporation, for separate purchase) for the PLBG0176GA-A package to the user system.

## CAUTION

- 1. Apply the solder paste to the BGA pads on the user system. Be careful to keep the thickness of the solder within 100 to 150 micro-meters. Applying too much solder will cause short circuiting between the pins.**
- 2. To avoid the scattering (dispersal) of flux from other components at the solder reflow , the protective tape (polimide tape) is affixed to the section for connection of the IC plug. Do not peel off the protective tape until the solder reflow is over.**
- 3. Do not install compnents that occupy large volume close to the IC socket. Such components will prevent the convective flow of heat during reflow.**
- 4. Do not use flux etc. to clean the IC socket.**

## 3.2 Connection to the User System When the Flexible Cable is in Use

The IC socket on the user system is connected with the emulator in either of two ways according to whether or not the flexible cable section of the common cable for the user system interface is in use. Refer to this section (section 3.2, Connection to the User System When the Flexible Cable is in Use) or section 3.3, Connection to the User System When the Flexible Cable is Not in Use, according to whether or not the flexible cable is in use.

While the flexible cable leads to longer delay times for generated signals to reach the device from the IC socket, the area taken up on the emulator board for the user system is smaller. This form of connection is thus applicable to a wider variety of layouts for the user system. Refer to point 3 of section 5 for details on the delay time.

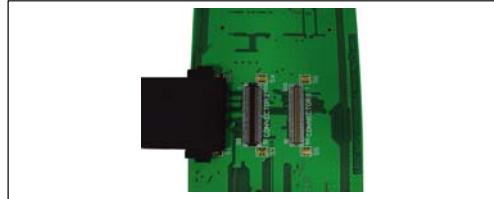
### 3.2.1 Assembling the User System Interface Cable

#### CAUTION

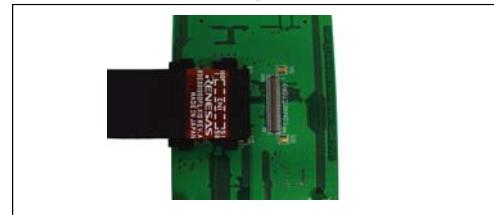
**Check the location of pin 1 and the connector number before insertion.**

- Connecting the user system interface cable

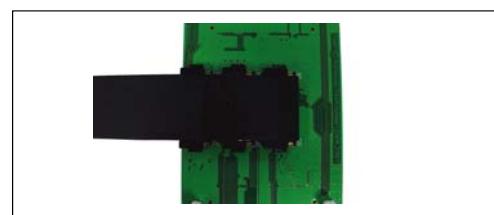
Use the flexible cable section of the common cable for the user system interface to connect the board section of the common cable for the user system interface with the user-system interface converter board (see figures 2 and 3).



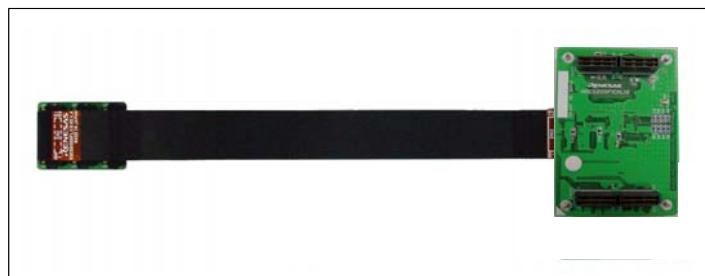
Connect the flexible cable to CONNECTOR1 mounted on the board section of the common user-system interface adaptor cable as shown below.



After that, connect the flexible cable to CONNECTOR2.

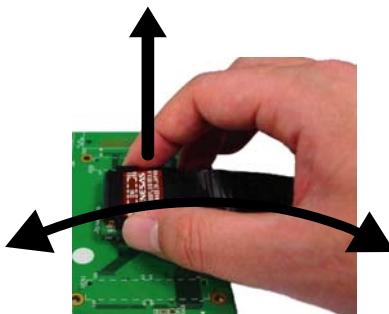


Connect the flexible cable to CONNECTOR3.



Connect the common user-system interface adaptor cable with the user-system interface PLQP0176KB-A converter board, with each of the three flexible cable sections of the adaptor cable connected to the corresponding connector ([CONNECTOR1], [CONNECTOR2], or [CONNECTOR3]) on the converter board.

**Figure 2 Connecting User System Interface Board to User System**



When removing the flexible cable from a converter board or a board section of the adaptor cable, keep the board in place, hold both sides of the connector at the head of the cable, and apply vertical force to pull the cable away. If the join is stiff so that the cable is difficult to remove, pull the cable head up from the right or left side. Do not apply pressure in the direction marked "X", since this will damage the connector.

**Figure 3 Removing the Flexible Cable**

### 3.2.2 Connecting User System Interface Board to EV-Chip Unit

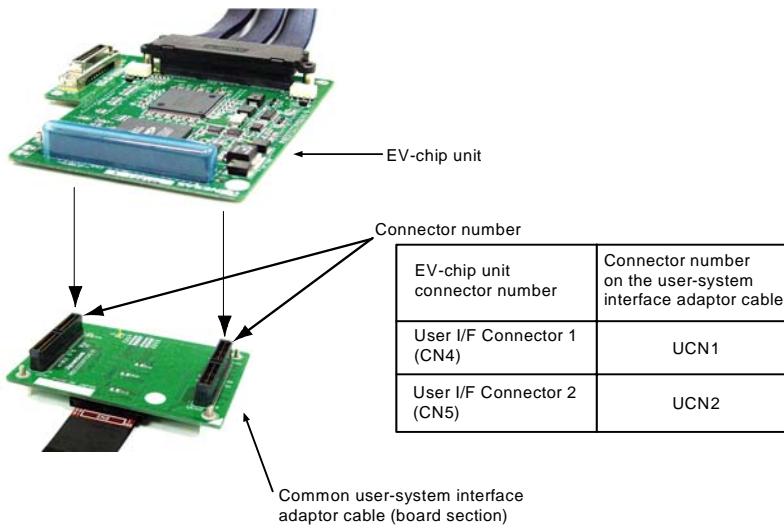


## WARNING

Observe the precautions listed below. Failure to do so will result in a FIRE HAZARD and will damage the user system and the emulator product or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.

1. Always switch OFF the user system and the emulator product before connecting the COMMON USER-SYSTEM INTERFACE ADAPTOR CABLE to or removing it from any part. Before connecting the cable, make sure that the pin 1 positions on both sides are correctly aligned.
2. Use the common user-system interface adaptor cable that is specifically for the emulator.

1. Make sure the user system and emulator are turned off.
2. Align the connectors on the board with those on the EV-chip unit according to their numbers (figure 4).



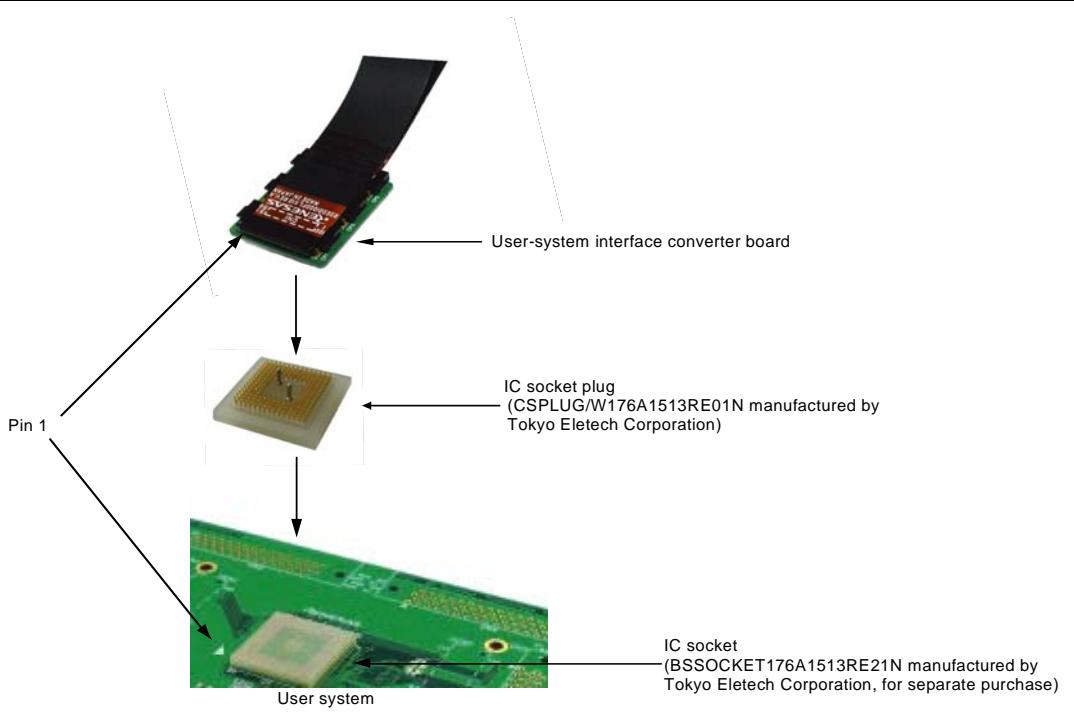
**Figure 4 Connecting the User System Interface Board to the EV-Chip Unit**

## 3.2.3 Installing to the IC Socket

**CAUTION**

1. Check the position of pin 1 and the connector number before insertion.
2. Ensure that the guide pins of the IC socket plug are inserted on the user system side.

Use the IC socket plug to affix the user system interface converter board to the IC socket for PLBG0176GA-A package on the user system. Apply vertical force to fasten the parts together. Take particular care to align the positions of pin 1 and the guide pin and to avoid the application of twisting force that might damage the soldered joint connector for ICE.



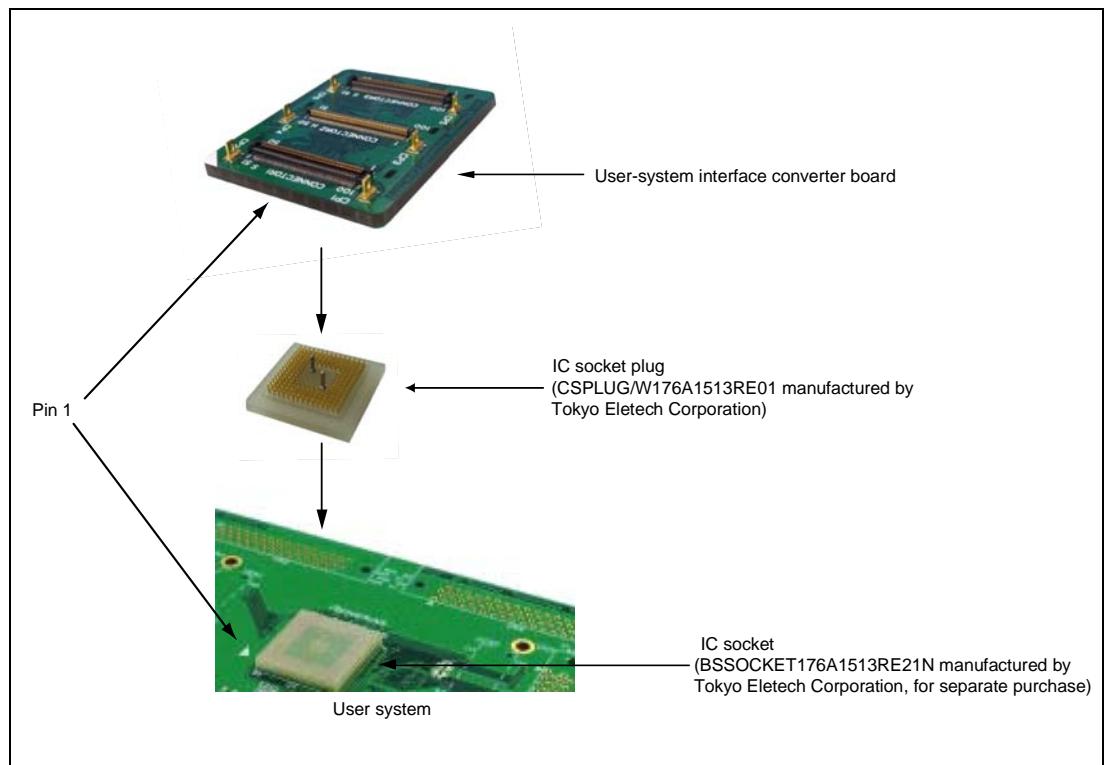
**Figure 5** Connecting the User System and User System Interface Board

### 3.3 Connection to the User System When the Flexible Cable is Not in Use

While the connection takes up a larger area on the emulator board for the user system when the flexible cable is not in use, delay times for generated signals to reach the device from the IC socket are shorter. This form of connection is thus applicable when the cable connection is leading to insufficient timing margins. Refer to point 3 of section 5, Verifying Operation, for details on the delay time.

#### 3.3.1 Mounting on the IC Socket

Use the IC socket plug to affix the user system interface converter board to the IC socket for PLBG0176GA-A package on the user system. Apply vertical force to fasten the parts together. Take particular care to align the positions of pin 1 and the guide pin and to avoid the application of twisting force that might damage the soldered joint connector for ICE.



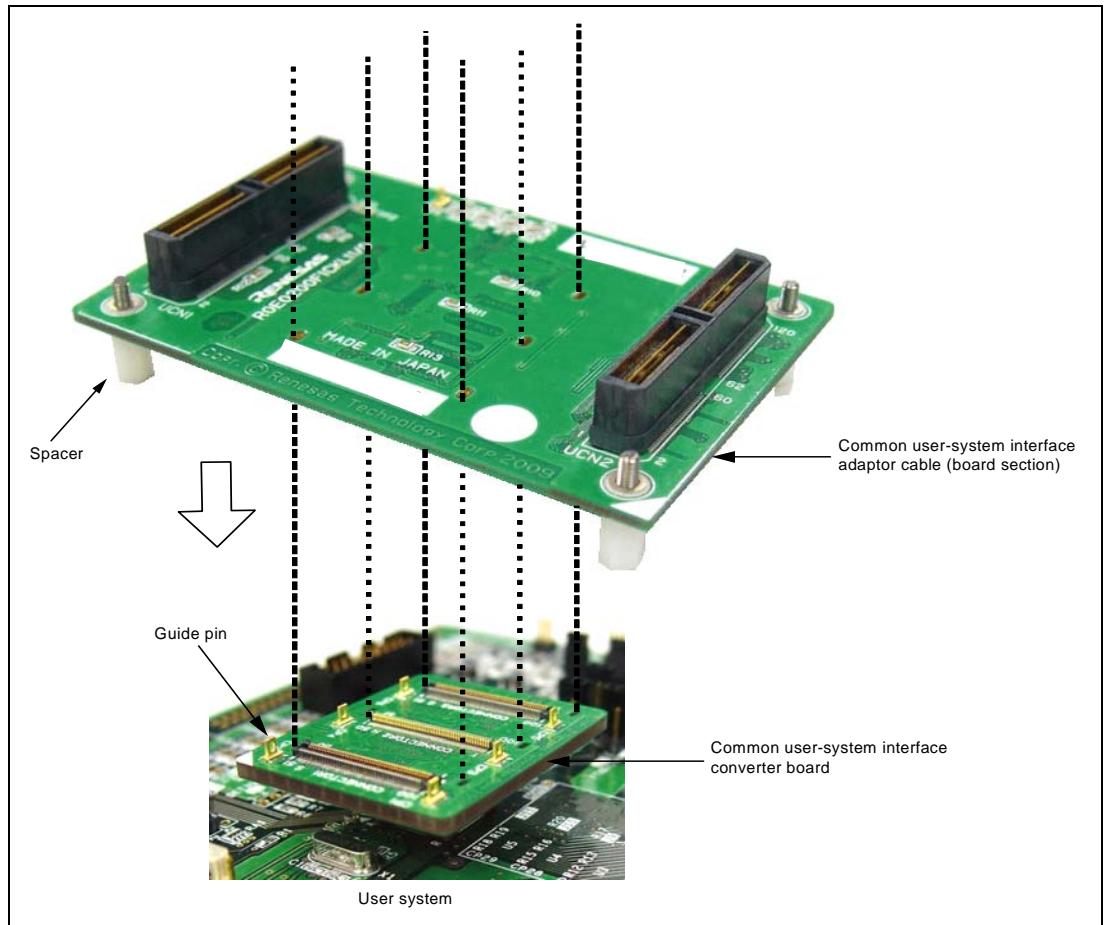
**Figure 6** Connecting the User System and User System Interface Board

### 3.3.2 Connecting the Common User-System Interface Adaptor Cable (Board Section)

## CAUTION

**Check the position of pin 1 and the connector number before insertion.**

Ensure that the positions of [CONNECTOR1], [CONNECTOR2], or [CONNECTOR3] on the common user-system interface adaptor cable match the positions of [CONNECTOR1], [CONNECTOR2], or [CONNECTOR3] on the user-system interface converter board, and connect the cable to the board. When they are correctly connected, the six guide pins on the user-system interface converter board will enter the holes on the board section of the common user-system interface adaptor cable.



**Figure 7 Connecting the Common User-System Interface Adaptor Cable (Board Section)**

### 3.3.3 Adjusting the Spacer Position

Adjust the positions of the spacers mounted on the four corners of the common user- system interface adaptor board so that they are in contact with the user system.

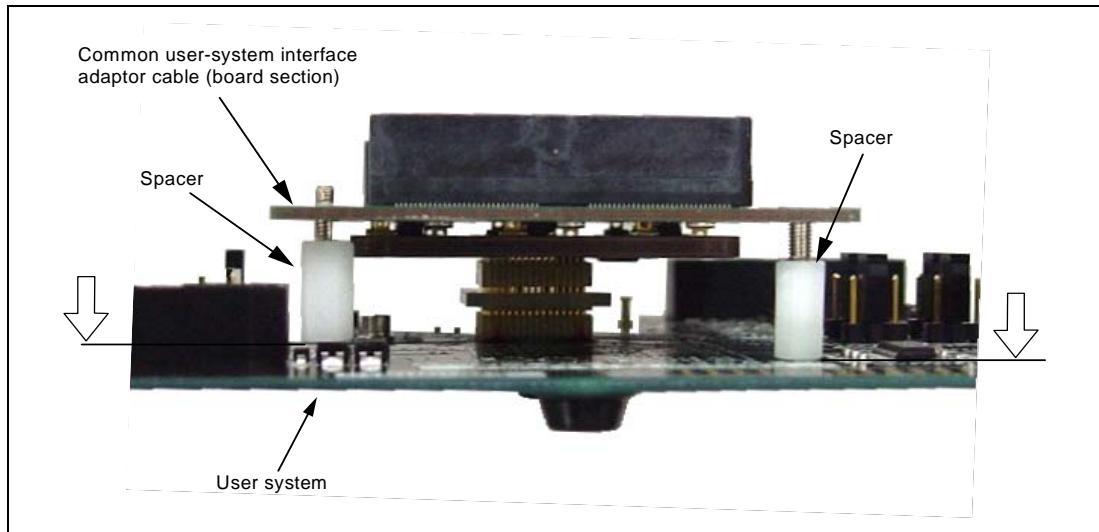


Figure 8 Adjusting the Spacer Position

### 3.3.4 Connecting the User System Interface Board to EV-Chip Unit

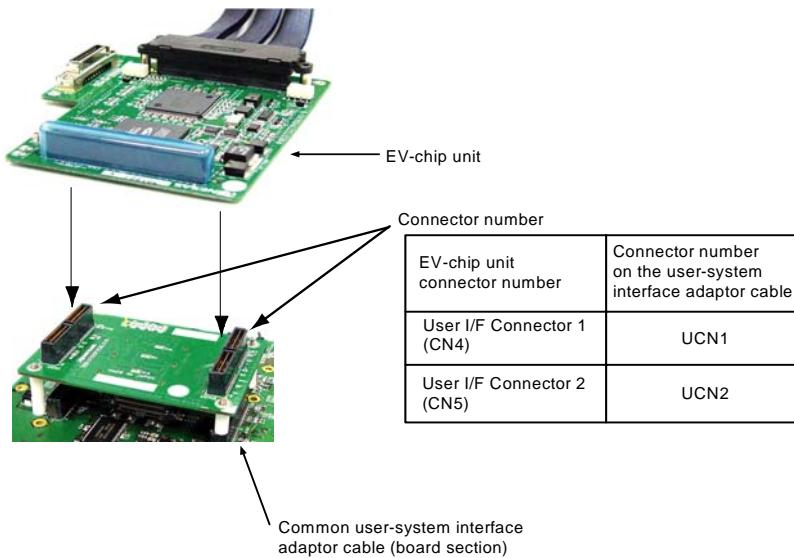


## WARNING

**Observe the precautions listed below. Failure to do so will result in a FIRE HAZARD and will damage the user system and the emulator product or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.**

1. **Always switch OFF the user system and the emulator product before connecting the COMMON USER-SYSTEM INTERFACE ADAPTOR CABLE to or removing it from any part. Before connecting the cable, make sure that the pin 1 positions on both sides are correctly aligned.**
2. **Use the common user-system interface adaptor cable that is specifically for the emulator.**

1. Make sure the user system and emulator are turned off.
2. Align the connectors on the board with those on the EV-chip unit according to their numbers (figure 9).



**Figure 9 Connecting the User System Interface Board to the EV-Chip Unit**

## 3.4 Dimensions

### 3.4.1 Recommended Dimensions for User System Mount Pad (Footprint)

Figure 10 shows the recommended dimensions of the pads for mounting of the IC socket for PLBG0176GA-A package (BSSOCKET176A1513RE21N manufactured by Tokyo Eletech Corporation, for separate purchase) on the user system (i.e. the footprint of the socket). Please contact Tokyo Eletech Corporation for the details of the pattern.

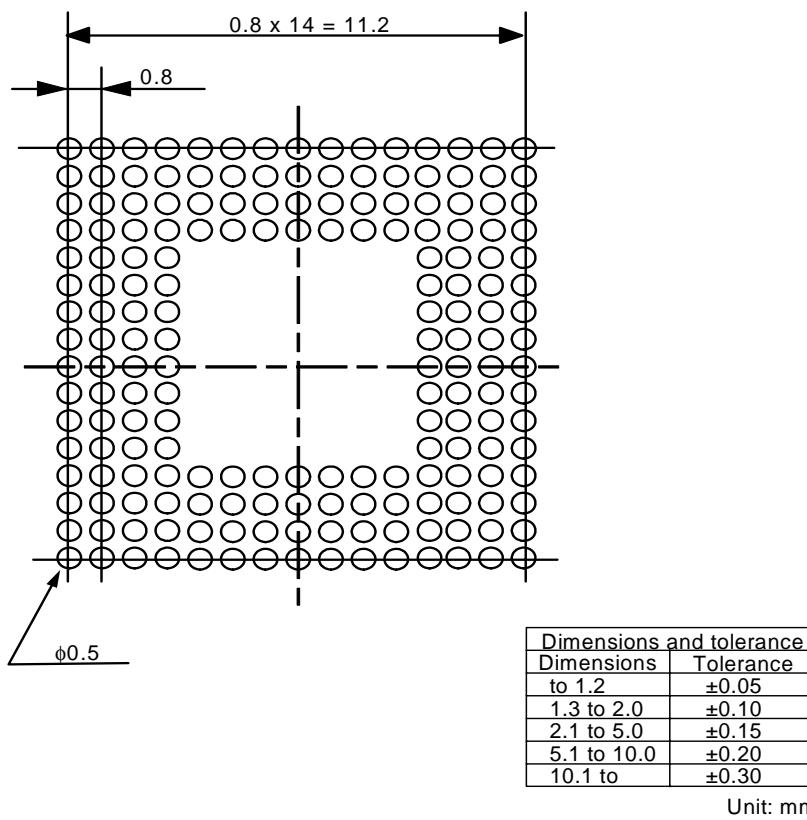
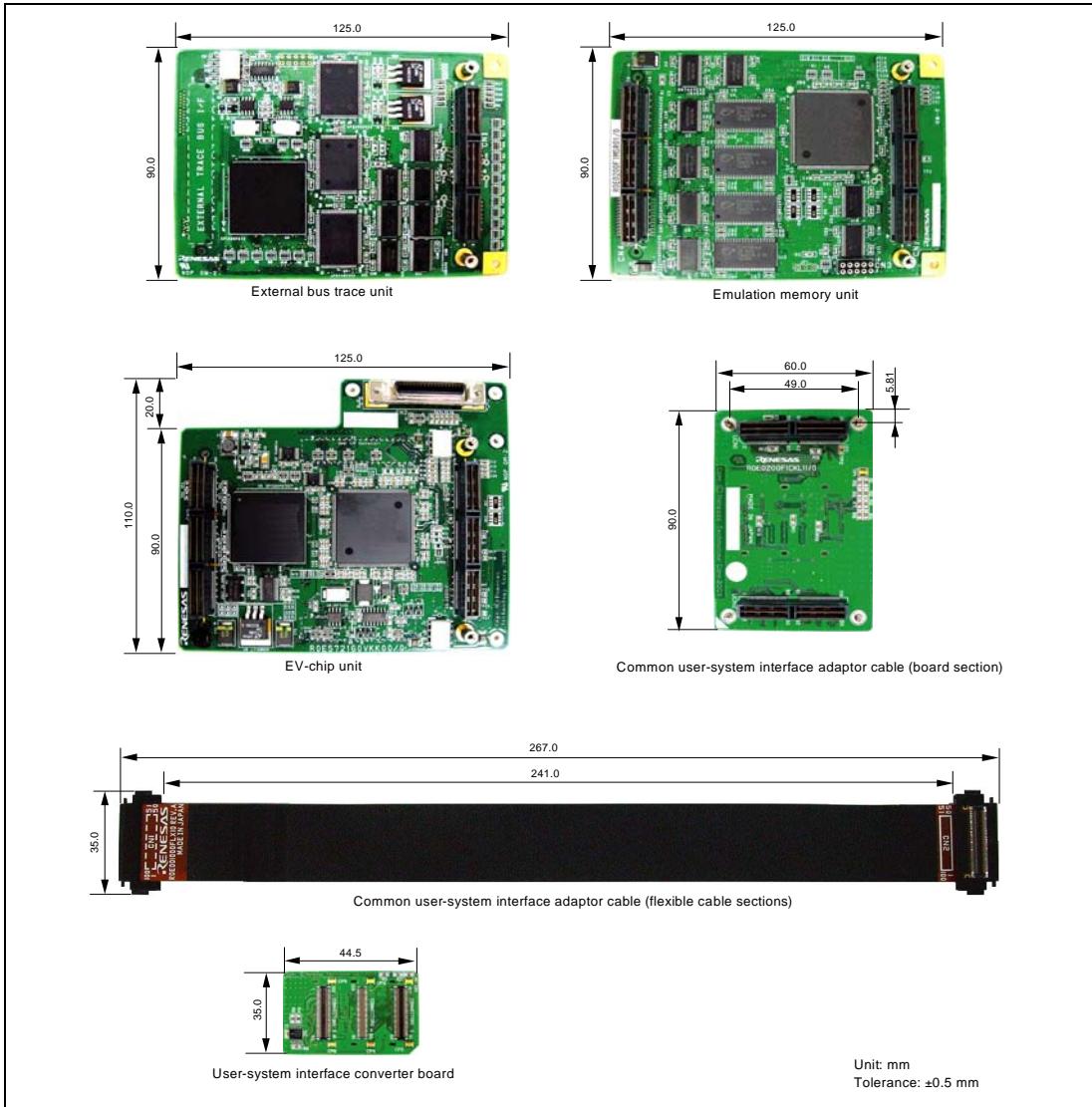


Figure 10 Recommended Dimensions for Mount Pad

### 3.4.2 External Dimensions

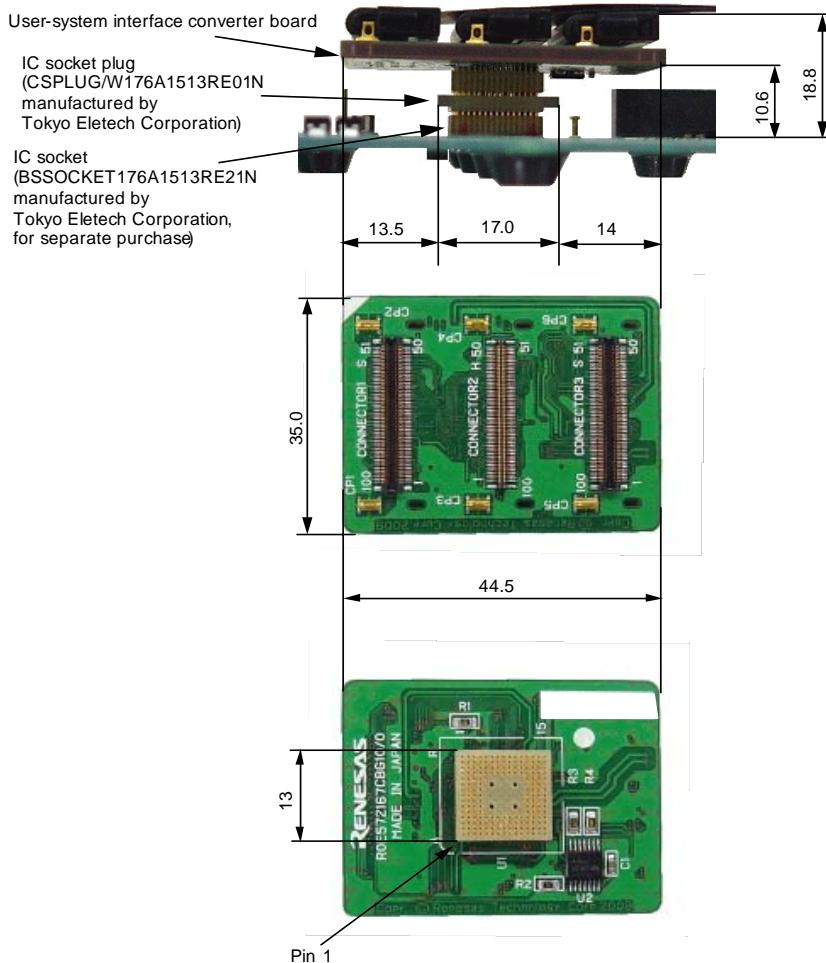
The external dimensions of the EV-chip unit, common user-system interface adaptor cable, and user-system interface converter board are shown in figure 11.



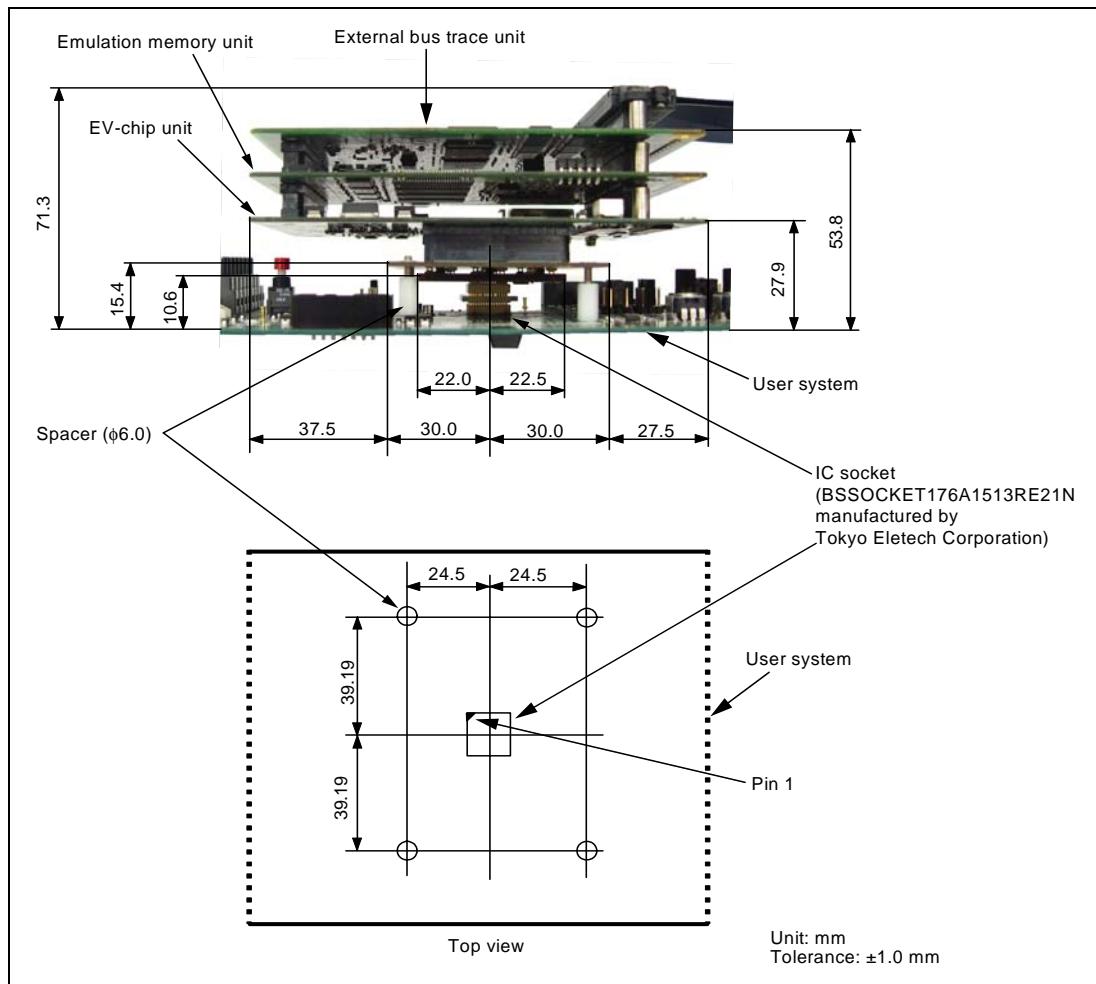
**Figure 11 External Dimensions of the External Bus Trace Unit, Emulation Memory Unit, EV-Chip Unit, Common User-System Interface Adaptor Cables, and the Converter Board**

### 3.4.3 Dimensions of User System Interface Converter Board when Connected

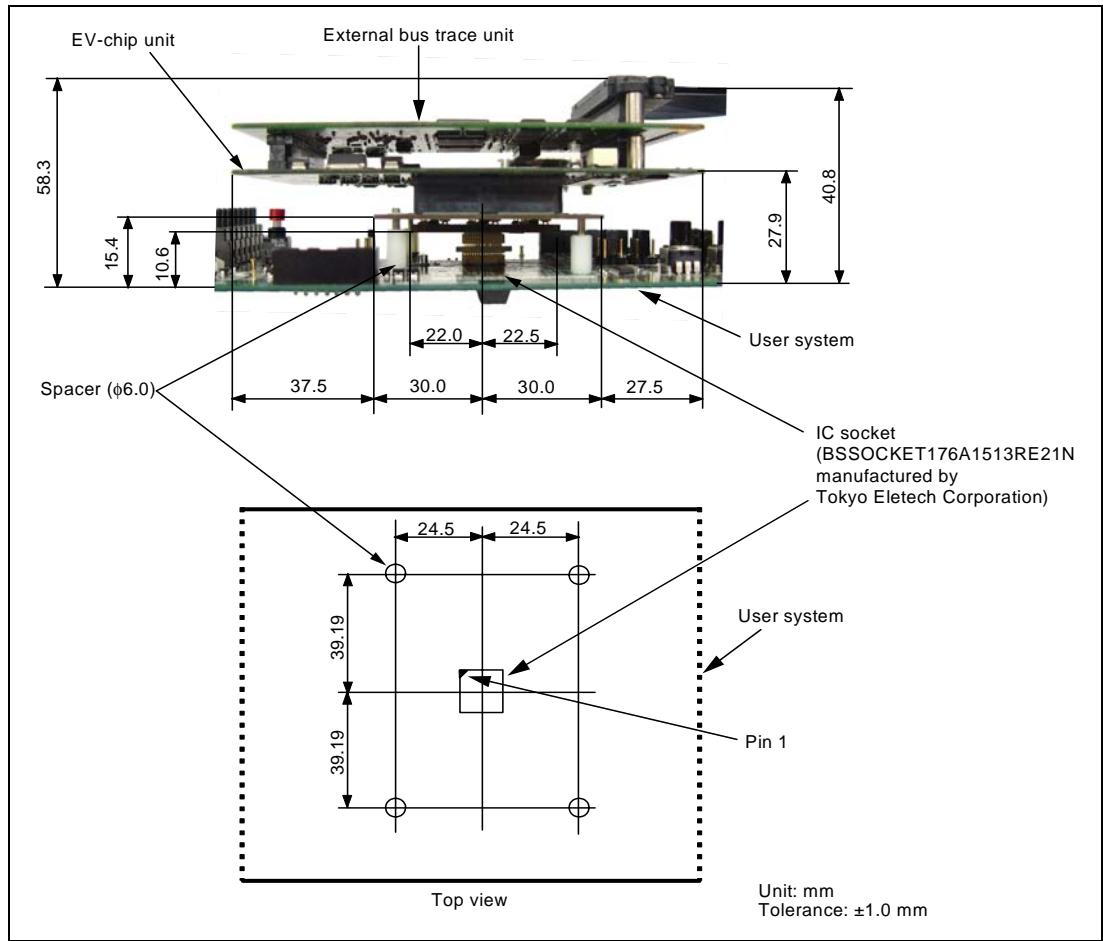
Dimensions of the user system interface converter board when it is connected to the user system are shown in figures 12 to 15.



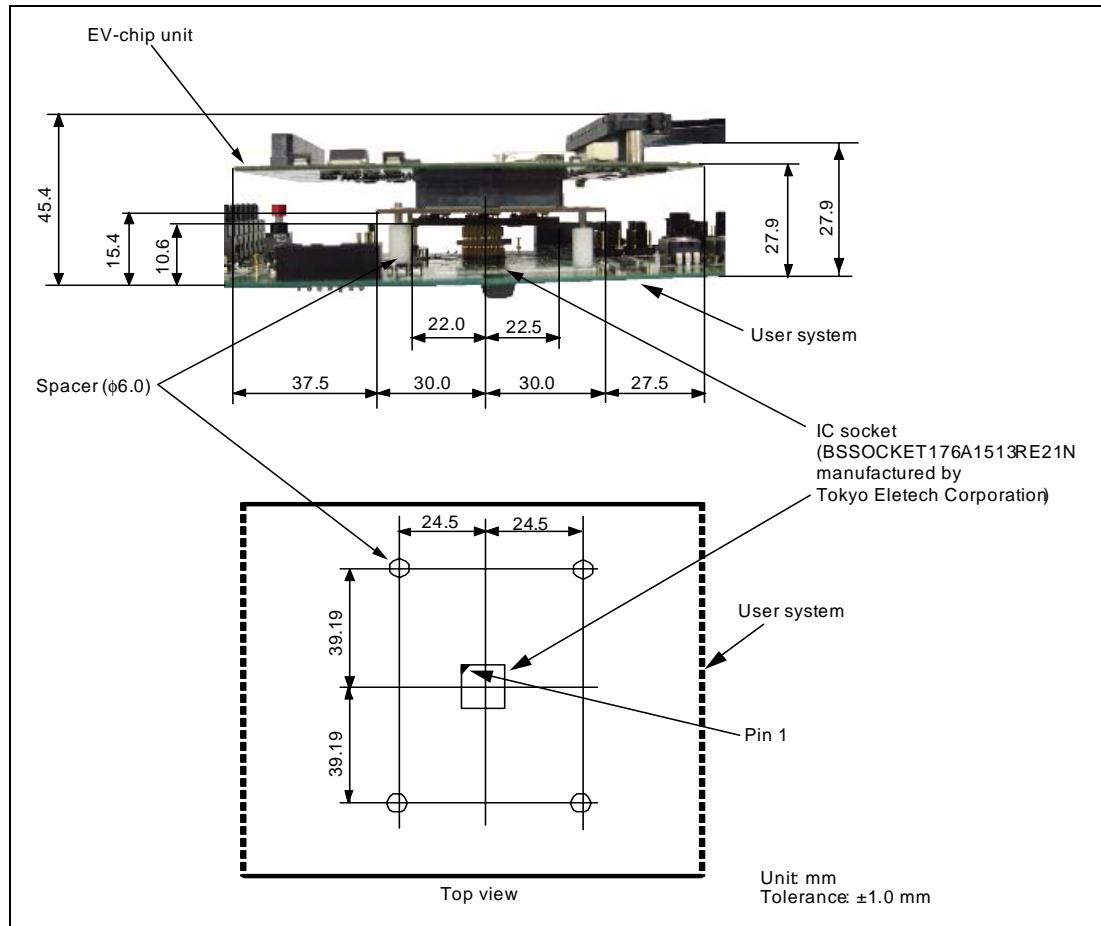
**Figure 12 Dimensions of the User-System Interface Converter Board when Connected to the User System (Connection Includes the Flexible Cable)**



**Figure 13 Dimensions of the User System and Connected User-System Interface Converter Board (with the External Bus Trace Unit, Emulation Memory Unit, and EV-chip Unit also Connected)**



**Figure 14 Dimensions of the User System and Connected User-System Interface Converter Board (with the External Bus Trace Unit and EV-chip Unit also Connected)**



**Figure 15 Dimensions of the User System and Connected User-System Interface Converter Board (with the EV-chip Unit also Connected)**

## Section 4 Installing the MCU to the User System

### CAUTION

- 1. Check the location of pin 1 before inserting.**
- 2. Use a Phillips-head screwdriver whose head matches the screw head.**
- 3. The tightening torque must be 0.054 Nom or less. If the applied torque cannot be accurately measured, stop tightening when the force required to turn the screw becomes significantly greater than that needed when first tightening. If a screw is tightened too much, the screw head may break or an IC socket contact error may be caused by a crack in the IC socket solder.**
- 4. If the MCU does not operate correctly, cracks might have occurred in the solder. Check conduction with a tester and re-solder the IC socket if necessary.**

To mount the MCU on the user system, use an IC socket (BSSOCKET176A1513RE21N, Tokyo Eletech Corporation, for separate purchase) and LSPACK (LSPACK176A1513RE01, Tokyo Eletech Corporation, for separate purchase), along with the guide board, spacer and cover for the IC socket.

1. Fit the BSSOCKET to the guide section of the LSPACK.
2. Place the guide board and spacer on the LSPACK. Adjust the guide points of the spacer to the LSPACK and the opening for components in the guide board.
3. Place the MCU gently in the opening of the spacer. Be sure to correctly align pin 1 of the MCU with the IC socket.
4. Put the top cover on the spacer. The four holes at the four corners of the spacer and of the cover must be aligned. Use the four screws to fasten the cover to the IC socket. Each screw in turn should be made a little tighter, alternating between screws on opposing corners. Use the screwdriver provided with the package. The torque in tightening must be 0.054 N·m or less.
5. When removing the cover from the LSPACK, hold the side of the cover so that no stress is applied to the solder connections between the LSPACK and CS/BSSOCKET while the screws on the cover are being unscrewed.

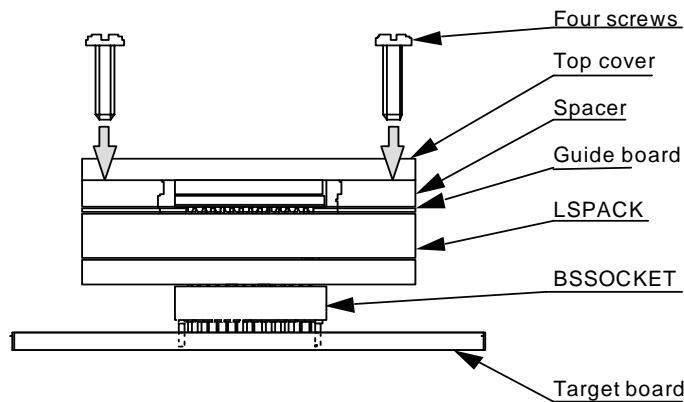


Figure 16 Installing MCU to User System

## Section 5 Verifying Operation

1. Turn on the emulator according to the procedures described in the SH7216 E200F Emulator User's Manual (R0E0200F1EMU00J or R0E572160EMU00J).
2. The emulator connected to this user-system interface converter board supports two kinds of clock sources as the MCU clock. For details, refer to the SH7216 E200F Emulator User's Manual (R0E0200F1EMU00J).
  - To use the emulator internal clock  
Select the [Emulator Internal Clock] in the [Select Emulation] dialog displayed when connecting to the emulator.
  - To use the external clock on the user system  
Select the [User System Clock] in the [Select Emulation] dialog displayed when connecting to the emulator.

Supply the external clock from the user system to the emulator by inputting the EXTAL pin (pin E14) on the user-system interface converter board or connecting the crystal oscillator to the XTAL (pin E15) and EXTAL pins. For details, refer to section 4, Clock Pulse Generator, in the SH7216 Group Hardware Manual.

Figure 17 shows the clock oscillator on the user system interface board.

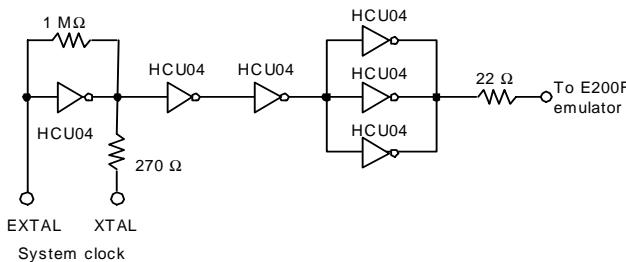


Figure 17 Clock Oscillator

3. When connecting the E200F emulator and the user system with the common user-system interface adaptor cable and the user system converter board, the wiring of the circuit between the IC socket pins and pins of the devices on the user system leads to delay times for the signals.

— When the connection includes the flexible cable

Table 3 gives the delay times when the common user-system interface cable is used with the supplied flexible cable.

**Table 3 Delay Times Created by Connection with the Flexible Cable**

No.	Signal Name	Delay Time (ns)
1	_RES	22
2	NMI	19
3	Other signals	6

— When the connection does not include the flexible cable

Table 4 shows the delay time generated when the supplied flexible cable has been removed from the common user-system interface adaptor cable.

**Table 4 Delay Times Created by Connection without the Flexible Cable**

No.	Signal Name	Delay Time (ns)
1	_RES	19
2	NMI	16
3	Other signals	3

## Section 6 Notice

1. Before connecting any parts or cables, make sure that pin 1 on the both sides are correctly aligned.
2. Do not apply excessive force to the user-system interface converter board while it is connected to the user system.
3. The dimensions of the recommended mount pad for the IC socket for this user-system interface converter board are different from those of the MCU.
4. This user-system interface converter board is specifically designed for the SH7216 E200F EV-chip unit (R0E572160VKK00). Do not use this board with any other emulator.
5. When power is not supplied to the VCCQ pin on the user-system interface converter board, the emulator displays \*\* VCC DOWN. The emulator will not operate correctly.



---

**SH7216 Group PLBG0176GA-A  
User System Interface Converter Board  
R0E572167CBG10 User's Manual**

Publication Date: Rev.1.00, July 2, 2010  
Published by: Renesas Electronics Corporation

---



## SALES OFFICES

## Renesas Electronics Corporation

<http://www.renesas.com>

Refer to "<http://www.renesas.com>" for the latest and detailed information.

### Renesas Electronics America Inc.

2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.  
Tel: +1-408-588-6000, Fax: +1-408-588-6130

### Renesas Electronics Canada Limited

1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada  
Tel: +1-905-898-5441, Fax: +1-905-898-3220

### Renesas Electronics Europe Limited

Dukes Meadow, Millboard Lane, Bourne End, Buckinghamshire, SL8 5FH, U.K.  
Tel: +44-1628-585-100, Fax: +44-1628-585-900

### Renesas Electronics Europe GmbH

Arcadiastrasse 10, 40472 Dusseldorf, Germany  
Tel: +49-211-65030, Fax: +49-211-6503-1327

### Renesas Electronics (China) Co., Ltd.

7th Floor, Quantum Plaza, No.27 Zhichunlu Haidian District, Beijing 100083, P.R.China  
Tel: +86-10-8235-1151, Fax: +86-10-8235-7679

### Renesas Electronics (Shanghai) Co., Ltd.

Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China  
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

### Renesas Electronics Hong Kong Limited

Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong  
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

### Renesas Electronics Taiwan Co., Ltd.

7F, No. 363 Fu Shing North Road Taipei, Taiwan  
Tel: +886 2-8175-9600, Fax: +886 2-8175-9670

### Renesas Electronics Singapore Pte. Ltd.

1 harbourFront Avenue, #06-10, keppel Bay Tower, Singapore 098632  
Tel: +65-6213-0200, Fax: +65-6278-8001

### Renesas Electronics Malaysia Sdn.Bhd.

Unit 903, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

### Renesas Electronics Korea Co., Ltd.

11F, Samik Laveri of Bldg, 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea  
Tel: +82-2-598-3737, Fax: +82-2-598-5141



SH7216 Group PLBG0176GA-A  
User System Interface Converter Board  
R0E572167CBG10 User's Manual



Renesas Electronics Corporation

REJ10J2185-0100